

**FACT SHEET FOR NPDES PERMIT  
NO. WA-005217-5**

**COMMUNITY OF PESHASTIN  
PUBLICLY-OWNED TREATMENT WORKS**

**SUMMARY**

Public Utility District No. 1 of Chelan County is seeking reissuance of the NPDES Discharge Permit for its Community of Peshastin Publicly-Owned Treatment Works. The treatment plant is located in Peshastin and serves the unincorporated Community of Peshastin and two nearby fruit packing facilities. A recent draft engineering report states that the POTW will provide service to an additional industrial site being developed adjacent to the treatment plant. The POTW discharges treated wastewater to the Wenatchee River.

The POTW was constructed in response to failing onsite systems and began operating in October 1997. Major components of the POTW include a STEP collection system with pressurized sewers, a four phase sequencing batch reactor, and ultraviolet disinfection.

In the past the treatment plant has encountered occasional, but severe, interference from constituents in process wastewater discharged by the fruit packing facilities. The most recent event occurred in September 2000, where a fungicide spill caused an upset at the POTW. This resulted in exceedances of ammonia limits being discharged to the receiving water. Additionally, previous to this, chemical additives used by the fruit packers have interfered with the treatment plant's ultraviolet disinfection process, causing exceedances of fecal coliform effluent limits. The past three year record indicate the bulk of these problems have been resolved.

The POTW's technology based effluent limits and the monitoring program remain essentially unchanged from the previous permit with a few exceptions: Loading for TSS and BOD have been adjusted to reflect changes in the design criteria based on corrections to the original erroneous calculations. Percent removal limits are removed. With a septic tank effluent pumped (STEP) system, percent removal expectations are inappropriate.

Monitoring for total nitrogen has been replaced with monitoring for total phosphorous. Phosphorus monitoring will continue for at least a period of two years in order to better understand the contribution of nutrient P entering the Wenatchee River currently under a Total Maximum Daily Load (TMDL) study. This river is 303d listed impaired waters for pH, DO and Temperature. A suite of TMDL allocations is likely to be enacted sometime during the proposed permit term. In the event TMDL allocations are determined for this facility, any new limits or monitoring requirements will be imposed via reissue or modification of the current permit.

This permit requires submittal to the Department of two wasteload assessments during the permit cycle.

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## **INTRODUCTION**

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Public Utility District No. 1 of Chelan County
Facility Name and Address	Peshastin Publicly-Owned Treatment Works 10395 Mill Road Peshastin, WA 98847
Type of Treatment	Septic tank effluent pump (STEP) system, activated sludge sequencing batch reactor (SBR), aerobic digester, and ultraviolet (UV) disinfection.
Discharge Location	Wenatchee River, River Mile 20.7  Latitude: 47° 34' 30" N Longitude: 120° 36' 41" W.
Water Body ID Number	WA-45-1010

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

#### History

The residents of the Community of Peshastin (Community) petitioned, in 1990, the Chelan County PUD #1 to determine the feasibility of providing wastewater collection, treatment, and disposal services to the residences and businesses of the area, because of the concern about onsite sewage system failures. The Community is located on the lower east slopes of the Cascades in the upper reaches of the Wenatchee River Valley, on Highway 2, about 100 miles east of Seattle and 17 miles west of Wenatchee.

Construction began on the Community's Publicly Owned Treatment Plant (POTW) in 1996 and the completed system began operating in October 1997.

The 2002 Final Wastewater treatment Facility Capacity Analysis Engineering Report has been approved by the Department in which the design capacity is increased.

#### Collection System Status

The collection system is composed of approximately 3.3 miles of 2-inch through 8-inch pressurized piping which delivers the effluent from various PUD-owned septic tanks to the

treatment facility. This type of collection system eliminates the need for pumping stations and deep excavations, and typically has low rates of infiltration and inflow.

### **Treatment Processes**

Wastewater from residences undergoes initial solids removal in this septic tank effluent pumped (STEP) system. Preliminary treatment is onsite, the septic tanks act as small primary clarifiers. As most of the solids remain in the septic tank, smaller diameter sewer lines can be used, and the main treatment plant does not require grit chambers, bar screens and other unit processes typically associated with a headworks.

Flows entering the main treatment plant are first pretreated by caustic soda or pre-chlorination injection systems, if necessary. The caustic soda system is used to maintain effluent pH above 6.0. The treatment plant is designed to nitrify wastewater (oxidize ammonia). During the nitrification process, wastewater alkalinity is consumed. Once all, or most of the alkalinity is consumed, wastewater is subject to rapid changes in pH. During operation of the caustic injection system, the operator must closely monitor ammonia levels and effluent pH.

The purpose of the pre-chlorination system is to minimize toxicity and odors caused by hydrogen sulfide in the influent, which is a common occurrence with pressurized collection systems. In the event excessive foaming occurs in the SBRs, an automated system tied to the influent meter injects chlorine to treat the problem. Influent is next measured by a magnetic flow meter located in the blower room. The flow meter provides information to the caustic soda and pre-chlorination systems and paces the influent auto-sampler.

The treatment plant utilizes a continuous-flow sequencing batch reactor (SBR) system which provides secondary treatment for the Community's wastewater. The primary components of the system include two basins that operate independently, coarse bubble diffusers, aeration blowers and solids pumps. Each SBR utilizes a four-phase process which combines aeration and clarification in the same basin, thereby eliminating the need for separate clarifiers and return activated sludge pumps. Each SBR can also be converted for ammonia, phosphorus, or nitrogen removal by altering the aeration and settling sequences. Each basin is equipped with a floating mixer to enable mixing when the aerators are not operating. The system is designed to meet average monthly effluent limits of 30 mg/L for BOD and TSS and 15 mg/L for ammonia. During normal operation the SBR system is completely automated, although the operator must monitor process control parameters to ensure that system processes are working effectively.

The treatment plant has two sludge digesters. The purpose of the digester system is to treat, stabilize, and thicken waste solids produced by the SBRs before they are pumped to the solids dewatering (bagging) system. The digester system is equipped with coarse bubble diffusers and aeration blowers.

After leaving the SBRs, wastewater flows through the effluent flow meter. Effluent flows are continuously recorded. This meter provides flow data to the downstream UV system and the effluent auto-sampler. These data are used to control flow and pace the auto-sampler.

The UV disinfection system contains two banks of low-intensity lamps. One bank of lamps can provide adequate disinfection for flows up to 95% of the maximum monthly design flow.

In accordance with WAC 173-230-140 this facility is classified as a Class II wastewater treatment plant, based on its primary treatment process (activated sludge) and design flow (less than 1 MGD).

The principal treatment plant operator of this system must be, at least, a Class II operator certified by the State of Washington. The facility is currently staffed by a Class II operator.

### **Discharge Outfall**

Secondary treated and disinfected effluent is discharged from the facility via an open-ended pipe into the Wenatchee River at River Mile 20.7. The discharge is continuous through a 300-foot long, 8-inch diameter effluent pipe connected to the outfall. The outfall, which rests on the bottom, was reported in the "as built drawings" at 3 feet below the water's surface. This value was determined no doubt when the outfall was installed and does not reflect low flow conditions. The 7Q10 low flow depth is 0.78 ft.

### **Residual Solids**

Any incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment are drained and disposed of as solid waste at the local landfill.

### **Biosolids**

The Permittee has recently signed a contract with Boulder Farms to land apply the treated biosolids generated by the treatment plant. The Permittee holds biosolids permit # BA-0052175.

### **PERMIT STATUS**

The previous permit for this facility was issued on May 11, 2000. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Ammonia.



An application for permit renewal was received by the Department on June 18, 2004 and accepted by the Department on June 21, 2004.

## SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on August 2, 2004 during the pre-permit meeting. During the previous permit cycle the facility has been in substantial compliance with the permit.

## WASTEWATER CHARACTERIZATION

### Influent

Loadings to the POTW were reported in DMRs submitted to the Department and are compared with the applicable design criteria as follows:

**Table 1: Influent Characterization**

Parameter	2-year Characterization		Design Criteria	% Design Criteria
	2-year <sup>1</sup> Average	Highest Monthly Average	Monthly Average for the Maximum Month	Two Year <sup>1</sup> Maximum Month
BOD <sub>5</sub> , in lbs/day	76.8	154	240	64.2
TSS, in lbs/day	43.5	210 <sup>2</sup>	240	87.5

<sup>1</sup> May, 2004 – May, 2002

<sup>2</sup> Occurred April, 2004.

### Effluent

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. Data reflect discharge characteristics for the May 2002 through May 2004 time frame. Maximum Daily Values reflect the highest reported concentrations of each parameter. Annual Average Values are an average of the monthly average values. The effluent is characterized as follows in Table 2.

**Table 2: Effluent Characterization**

Parameter	Units	Maximum Daily Value	Two Year Average Value
Flow	MGD	0.080	0.042
5-day Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/L	10.6	2.7
Total Suspended Solids (TSS)	mg/L	20.5	4.3
Fecal Coliform Bacteria	#/100 mL	377	2.8
Temperature (Winter)	°C	11.8	11.2
Temperature (Summer)	°C	23.2	22.3
Ammonia (as N)	mg/L	1.88	0.4
Total Kjeldahl Nitrogen (TKN)	mg/L	14.2	3.4
Dissolved Oxygen (DO)	mg/L	8.68	3.7
		<b>Minimum Value</b>	<b>Maximum Value</b>
pH	S. U.'s	6.86	8.68

A review of DMRs in the Department's files indicates the Permittee is in substantial compliance with the permit. There are only two instances where the DMRs were received late.

## PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always

developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

## DESIGN CRITERIA

In accordance with WAC 173-220-130(1)(a), effluent limitations shall not be less stringent than those based upon the design criteria for the facility, which are contained in approved engineering plans, reports, or approved revisions. Also, in accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The original design criteria for this treatment facility were developed in the *Community of Peshastin Wastewater Engineering Report*, dated May 1994, and prepared by Parametrix, Inc. However, the design criteria were subsequently changed. The present permit used treatment plant design criteria taken from the facility's Operation and Maintenance (O&M) Manual.

In December of 2002 the Department approved the Peshastin Wastewater Facility Capacity Analysis Engineering Report. The new design criteria for the WWTP are as follows in Table 3:

**Table 3: Design Standards for the Peshastin WWTP**

Parameter	Previous Design Criteria	New Design Criteria
Maximum monthly flow (MGD)	0.11	0.11
Maximum daily flow (MGD)	0.20	0.20
Peak hydraulic flow (MGD)	0.27	0.27
Average annual flow (MGD)	0.09	0.09
BOD influent loading (lbs/day)	193	240
TSS influent loading (lbs/day)	64	240
Design population equivalent (# of people)	550	1,100

## TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all

known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The previous permit contained limits based on percent removal of TSS and BOD. The facility is a STEP system and consequentially such a requirement is not appropriate. Influent arriving at the treatment plant has already undergone solids removal in the individual septic tanks at the beginning of the STEP system process. Therefore, it is impossible to generate an influent loading figure in the traditional sense where raw sewage entering a sewage treatment plant (STP) is the basis for percent removal. The percent removal requirement is eliminated in the proposed permit.

The following technology-based limits for pH, Fecal Coliform Bacteria, BOD<sub>5</sub>, and TSS were the most appropriate limits taken from: (1) WAC 173-221-040(1); (2) the submitted engineering report and wastewater discharge application; and (3) the Department's *Permit Writer's Manual*:

<u>Parameter</u>	<u>Limit</u>
<u>pH</u> :	Shall be within the range of 6 to 9 standard units.
<u>Fecal Coliform Bacteria</u> :	Monthly Geometric Mean = 200 colonies/100 mL Weekly Geometric Mean = 400 colonies/100 mL
<u>BOD<sub>5</sub></u> :	Average Monthly Limit = 30 mg/L Average Weekly Limit = 45 mg/L
<u>TSS</u> :	Average Monthly Limit = 30 mg/L Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b):

Monthly BOD <sub>5</sub> effluent mass loading (lbs/day) =	Maximum monthly design flow (0.11 MGD) x 30 mg/L X 8.34 = 27.5 lbs/day.
Monthly TSS effluent mass loading (lbs/day) =	Maximum monthly design flow (0.11 MGD) x 30 mg/L X 8.34 = 27.5 lbs/day.
Weekly BOD <sub>5</sub> effluent mass loading (lbs/day) =	1.5 x Monthly BOD <sub>5</sub> effluent mass loading = 41.25 lbs/day.
Weekly TSS effluent mass loading (lbs/day) =	1.5 x Monthly TSS effluent mass loading = 41.25 lbs/day.

Mass loading limitations from the existing permit have been justified to reflect the new design criteria.

## **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### **Ammonia Considerations**

Effluent from this facility is unlikely to cause exceedance of the ammonia criteria in the receiving water. Reasonable Potential Analysis based on the past three years performance indicates an ammonia limit for this facility is not required and therefore the ammonia limit will be removed from the permit. The permit however, requires monitoring of the effluent ammonia to verify ammonia removal.

The POTW operator should implement necessary actions to maintain optimum plant nitrification during the critical period. The Department may require additional monitoring of the effluent and the receiving water if it is determined that a reasonable potential for exceedance of ammonia criteria exists.

## **DESCRIPTION OF THE RECEIVING WATER**

The facility discharges to the Wenatchee River, which is designated as a Class A receiving water in the vicinity of the outfall. Characteristic uses include the following:

Water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses. However, the 1998 303(d) list classifies this segment of the Wenatchee River as water quality-impaired for the following parameters: (insufficient) instream flow, pH, and temperature. A TMDL for the Wenatchee River Watershed is pending for pH, Temperature and Dissolved Oxygen that includes the reach of the river where this facility is located. The pH and dissolved

oxygen parameters can be influenced by nutrient loading which effects plant growth. A TMDL for nutrients in particularly phosphorus in addition to the above is a distinct possibility.

### Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below in Table 4:

**Table 4: Applicable Water Quality Criteria**

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

### Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### Numerical Criteria for the Protection of Human Health

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to

adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

### CRITICAL CONDITIONS

Determination of the reasonable potential for exceedance of the surface water quality standards are made for the waterbody's critical conditions, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Table 5 contains data which reflect effluent characteristics from 2000-2003 during the low flow months of September and October and were used in the reasonable potential determination. The receiving water data were taken from section 4.3 of the 1994 ER.

**Table 5: Ambient and Effluent Characteristics during Critical Conditions <sup>1</sup>**

Parameter	Receiving Water	Effluent	3 Year Average 2000-2003
Flow, cfs	384	0.20 <sup>2</sup>	0.17
Velocity, fps	2.27	N/A	N/A
Water depth, feet	0.78	N/A	N/A
Width of Receiving Water, feet	217	N/A	N/A
Hardness, mg/L as CaCO <sub>3</sub>	25.0	200	178.5
Alkalinity, mg/L as CaCO <sub>3</sub>	28.0	200	210
Temperature (max.), °C	18.8	22.0	20.5

Ph	8.0	9.0	7.5
DO, mg/L	9.5	2.0	3.3
Fecal Coliform, #/100ml	6	100	5.8
Total Ammonia, mg/L	0.05	8.0	0.5

<sup>1</sup> Months of September and October

<sup>2</sup> Taken from the Maximum daily flow design criteria

Pollutant concentrations in the discharge exceed, or have a reasonable potential to exceed, the water quality criteria with technology-based controls which the Department has determined to be AKART. Mixing zones are authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC.

### Mixing Zones

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving AKART and in accordance with other mixing zone requirements of WAC 173-201A-100.

### Dilution Factors

When pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART, mixing zones may be authorized in accordance with Chapter 173-201A WAC.

Dilution factors have been recalculated in response to a TMDL study on the Wenatchee River for dissolved oxygen, temperature and pH.

A mathematical model, RIVPLUM5, was used to determine the dilution factors of effluent to receiving water that occur within the allowable mixing zones at the critical condition. The chronic dilution factor was determined to be **132.4** and the acute determination was **32.4**. These dilution factors were then compared with those derived from a mass balance equation:

$$DF = \frac{(C_e - C_a)}{(C_p - C_a)}$$

Where:

DF = dilution factor

Ce = concentration in discharge effluent



Ca = concentration in ambient receiving water  
Cp = desired concentration at edge of mixing zone

The chronic dilution value was determined to be **533.4** and the acute was determined at **74**.

The RIVPLUM5 model is the more stringent of the two models therefore, the following dilution factors were established for the proposed permit:

<u>Acute</u>	<u>Chronic</u>
<b>32.4</b>	<b>132.9</b>

### **Sediment Quality**

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

### **GROUND WATER QUALITY LIMITATIONS**

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground; therefore, no limitations are required based on potential effects to ground water.

**COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED  
MAY 11, 2000**

Parameter	Existing Permit		Proposed Permit	
	Average Monthly	Average Weekly	Average Monthly	Average Weekly
BOD <sub>5</sub> , in mg/L; lbs/day	30 mg/L 19.3 lbs/day	45 mg/L 29.0 lbs/day	30 mg/L 27.5 lbs/day	45 mg/L 41.25 lbs/day
TSS, in mg/L; lbs/day	30 mg/L 9.6 lbs/day	45 mg/L 14.4 lbs/day	30 mg/L 27.5 lbs/day	45 mg/L 41.25 lbs/day
Fecal Coliform Bacteria, in #colonies/100 mL	200/100 mL	400/100 mL	200/100 mL	400/100 mL
Ammonia, in mg/L	10 mg/L 9.2 lbs/day	14 mg/L 13.8 lbs/day	No limit required	No limit required

The adjustment to the mass loading limit for TSS and BOD reflects a reevaluation of the design capacity of the POTW taken from the approved Final Wastewater Treatment facility Engineering Report, October 2002.

The ammonia limit has been removed as no reasonable potential exists for the POTW to exceed the State Water Quality Standard of 5.4 mg ammonia/L in the chronic mixing zone and 0.870 mg ammonia in the acute mixing zone.

The performance standard of a level limit of 85% removal of TSS and BOD has been removed from the permit. The nature of a STEP system sewage treatment plant renders this requirement impossible to measure.

### **MONITORING REQUIREMENTS**

Effluent monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring and testing schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the Department's *Permit Writer's Manual*.

Nutrient enrichment occurring in the receiving water is of concern to the Department. In view of the TMDL for pH, Dissolved Oxygen and Temperature a better understanding of point source

nutrient loading is desirable. Nutrient loading in the river directly affects plant growth which in turn is largely responsible for wide swings in pH and dissolved oxygen as the plants respire.

TKN monitoring will be suspended in the proposed permit. The data collected to date provides the Department with sufficient data with which to assess the performance of the facility and characterize the relationship between TKN and effluent ammonia at this facility. Phosphorous, believed to be a limiting factor in plant growth, will be monitored instead of TKN.

Decaying plant material can deplete oxygen levels to where fish and other organisms cannot survive. Phosphorus, often a limiting factor in plant growth, has not been characterized at this facility. Therefore the Department will require the Permittee to monitor Total Phosphorous monthly for at least a period of two years. This will enable the Department to better understand the contribution of nutrient loading, nitrogen and phosphorous, from the Peshastin treatment facility.

## LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited in general chemistry for Dissolved Oxygen, pH, Ammonia, BOD and TSS and in microbiology for Fecal Coliform.

## OTHER PERMIT CONDITIONS

### REPORTING AND RECORDKEEPING

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

The proposed permit requires two wasteload assessment be conducted, one at the middle of the permit term and a second to be conducted prior to application for permit renewal in order to monitor growth or changing character of the influent.

### **OPERATION AND MAINTENANCE (O&M)**

The proposed permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

### **RESIDUAL SOLIDS HANDLING**

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Douglas County Health Department.

### **DUTY TO ENFORCE DISCHARGE PROHIBITIONS**

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

## PERMIT ISSUANCE PROCEDURES

### PERMIT MODIFICATIONS

The Department may modify the proposed permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify the proposed permit as a result of new or amended State or federal regulations.

### RECOMMENDATION FOR PERMIT ISSUANCE

The proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State. The Department proposes that the proposed permit be issued for five (5) years.

### GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## REFERENCES FOR TEXT AND APPENDICES

Hammond, Collier & Wade-Livingstone Associates, Inc.

*-Preliminary Engineering Report on the Feasibility of Source Separation and Pre-rinse Systems to Eliminate Process Inhibition at the Peshastin Treatment Facility, September 1998.*

Parametrix, Inc.

*-Community of Peshastin Wastewater Engineering Report, May 1994.*

*-Community of Peshastin Wastewater Treatment Facilities Operation and Maintenance Manual, March 1998.*

*-Community of Peshastin Wastewater STEP Collection System, February 1996.*

*- Community of Peshastin Wastewater Treatment Facility Capacity Analysis Engineering Report, October 2002*

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations( <http://www.ecy.wa.gov/laws-rules/index.html> )

Permit and Wastewater Related Information  
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

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1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on date and date in name of publication to inform the public that an application had been submitted and to invite comment on the reissuance (or issuance) of this permit.

The Department will publish a Public Notice of Draft (PNOD) on date, in name of publication to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Central Regional Office  
15 West Yakima Avenue, Suite 200  
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This permit and fact sheet was written by Richard A. Marcley.



## APPENDIX B -- GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for “all known, available, and reasonable methods of prevention, control, and treatment”.

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD5** – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C -- TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Spread of a plume from a point source in a river with boundary effects from the shoreline based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

### INPUT

	Acute	Chronic
1. Effluent Discharge Rate (cfs): Max day flow in 3 years	0.12	
1. Effluent Discharge Rate (cfs): Max month flow in 3 years		0.09
2. Receiving Water Characteristics Downstream From Waste Input		
Stream Depth (ft):	0.78	0.78
Stream Velocity (fps):	1.30	1.30
Channel Width (ft):	217.00	217.00
Stream Slope (ft/ft) or Manning roughness "n":	0.007	0.007
0 if slope or 1 if Manning "n" in previous cell:	0	0
3. Discharge Distance From Nearest Shoreline (ft):	0	0
4. Location of Point of Interest to Estimate Dilution		
Distance Downstream to Point of Interest (ft):	30	300
Distance From Nearest Shoreline (ft):	0	0
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0	0

### OUTPUT

1. Source Conservative Mass Input Rate		
Concentration of Conservative Substance (%):	100.00	100.00
Source Conservative Mass Input Rate (cfs*%):	11.80	9.10
2. Shear Velocity		
Shear Velocity based on slope (ft/sec):	0.419	0.419
Shear Velocity based on Manning "n":		
using Prasnun equations 8-26 and 8-54 assuming hydraulic radius equals depth for wide channel		
Darcy-Weisbach friction factor "f":	#N/A	#N/A
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	#N/A	#N/A
Selected Shear Velocity for next step (ft/sec):	0.419	0.419

3. Transverse Mixing Coefficient (ft <sup>2</sup> /sec):	0.196	0.196
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)		
Co	5.36E-02	4.14E-02
x'	9.62E-05	9.62E-04
y'o	0.00E+00	0.00E+00
y' at point of interest	0.00E+00	0.00E+00
Solution using superposition equation (Fischer eqn 5.9)		
Term for n= -2	0.00E+00	0.00E+00
Term for n= -1	0.00E+00	0.00E+00
Term for n= 0	2.00E+00	2.00E+00
Term for n= 1	0.00E+00	0.00E+00
Term for n= 2	0.00E+00	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	30.00	300.00
x' Adjusted for <i>Effective Origin</i>	9.62E-05	9.62E-04
C/Co (dimensionless)	5.75E+01	1.82E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	3.09E+00	7.52E-01
Unbounded Plume Width at Point of Interest (ft)	12.038	38.067
Unbounded Plume half-width (ft)	6.019	19.034
Distance from near shore to discharge point (ft)	0.00	0.00
Distance from far shore to discharge point (ft)	217.00	217.00
Plume width bounded by shoreline (ft)	6.02	19.03
Approximate Downstream Distance to Complete Mix (ft):	124,782	124,782
Theoretical Dilution Factor at Complete Mix:	1,864.729	2,418.000
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	51.722	212.088
Calculated Dilution Factor at Point of Interest:	<b>32.412</b>	<b>132.906</b>

<b>Mass-balance Chronic Dilution Factor Calculation</b>	<b>Mass-balance Acute Dilution Factor Calculation</b>
July - October 7Q10 = 362 cfs	July - October 7Q10 = 362 cfs
25% of 7Q10 = 90.5 cfs	2.5% of 7Q10 = 9.05 cfs
Average monthly design flow (max. month) = 0.11 MGD or 0.17 cfs	Highest Daily Maximum in 3 Years = 0.08 MGD or 0.124 cfs
DFc = (Qa + Qe)/Qe	DFc = (Qa + Qe)/Qe



$DFc = (90.5 + 0.17)/0.17$	$DFc = (9.05 + 0.124)/0.124$
<b>DFc = 533.4</b>	<b>DFa = 74</b>

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

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INPUT

1. Ambient Temperature (deg C; 0<T<30)	20.5
2. Ambient pH (6.5<pH<9.0)	8.00
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

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OUTPUT

1. Intermediate Calculations:	
Acute FT	1.00
Chronic FT	1.41
FPH	1.00
RATIO	14
pKa	9.39
Fraction Of Total Ammonia Present As Un-ionized	3.9569 %
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	259.8
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	41.9
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	6.6
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.1
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	5.4
Chronic Ammonia Criterion as mg N	0.87

REASONABLE POTENTIAL		CALCULATIONS				
State Water Quality Standard		Max concentration at edge of.....				
Parameter	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	<b>LIMIT REQ'D?</b>	Effluent percentile value
AMMONIA	5400.0	870.0	343.6	85.28	<b>NO</b>	0.95
Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV		# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
1880.00	0.60	0.55	1	6.20	32.4	132.9

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98

*Pn*

0.050

**APPENDIX D -- RESPONSE TO COMMENTS**